

A study of

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E193/E383

where a is the thermodynamic activity of the alloying additions (which in very dilute solutions is equal to the alloying-addition concentration),

e is the electron charge,

Z^* is the effective charge of the alloying addition, and

E is the electric-field strength.

The tangent of the angle of slope of the $\ln I = f(x)$ is given by:

$$\operatorname{tg} \alpha = \frac{d \ln I}{dx} = \frac{d \ln C}{dx} = \frac{eZ^*E}{kT},$$

whence:

$$Z^* = \frac{\operatorname{tg} \alpha \cdot kT}{eE} \quad (3).$$

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The time, t , required for the establishment of steady conditions, was calculated from:

$$t = \frac{x^2}{2D} \quad (4) ,$$

x being $l/2$, where l is the specimen length. The effective charge, Z^* , of Ag^{110} determined in this manner from results obtained on specimens contained in capillaries of various diameters, was practically independent of the capillary diameter, which proved that Z^* was not affected by any surface phenomena. Since Pikus and Fiks (Ref. 7: Fizika tverd. tela, 1959, v.1, no. 7), had shown that the scattering of electrons on capillary walls gave rise to electroconvection diffusion, the present authors studied the effect of the variation in the current density on the apparent charge, Z^* , of Co^{60} in Sn at 350 °C. It was found that the current density

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($E^2 \times 10^{10}$) increasing from 0.22 - 79.2, Z^{M}_{KQ} decreased from -6.3 to -0.76, the $Z^{\text{M}}/Z^{\text{M}}_{\text{KQ}}$ ratio increasing from 1 to 8.3. This effect was attributed to the fact that electro-convection taking place at high current densities reduced the concentration gradient and brought about a decrease in the electric-transport effect. In this case, the electric transport flux was equal to the counter current flux due to diffusion and electro-convection. Starting from these premises and from the fact that $\frac{Z^{\text{M}}}{Z^{\text{M}}_{\text{KQ}}} = f(E^2)$ relationship plotted in Fig. 1 is a straight line - the present authors derived a formula:

$$\text{tg } \alpha = \frac{10^{-4}}{0.48 D_{\text{Sn}} \cdot D_{\text{Co in Sn}}} (1 - \varepsilon)^2 \left(\frac{\text{end } \lambda^2}{\eta} \right)^2 \quad (8) ,$$

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where α is the angle of slope of the graph in Fig. 1,
 D_{Sn} and D_{Co} in Sn are diffusion coefficients of Sn
 and Co in Sn,
 ϵ is the portion of electrons mirror-wise
 reflected from the boundary,
 n is the electron density,
 d the capillary diameter,
 λ free electron path, and
 η viscosity.

Taking $\epsilon = 0$, $n = 1.43 \times 10^{23} \text{ cm}^{-3}$, D_{Sn} and D_{Co} in Sn \approx
 $\approx 1 \times 10^{-5} \text{ cm}^2/\text{sec}$, the present authors calculated from
 formula (8) that the free electron path in molten Sn was
 $\lambda = 2.2 \times 10^{-7} \text{ cm}$. In the next series of experiments the charge
 of a mixture of $\text{Sn}^{113-123}$ isotopes in molten Pb and Tl was

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determined at 350 and 450 °C. The results indicated that Z^M was independent of temperature. The results of the next series of experiments are given in a table, where the effective and real charges (Z^M and X^M , respectively) of Ag^{110} and Ag^{198} in various metals of the fifth and sixth periods are given. The difference between charges of Ag and Au in metals of the fifth and sixth periods cannot, in the opinion of the present authors, be explained in terms of an energy-band model. It is more likely that the effects observed are associated with localized interaction between the impurity (Au, Ag) and the solvent metal. This view is supported by consideration of the constitution diagrams of systems formed by Au and Ag with the metals of the 5th and 6th periods. The diagrams of systems comprising Au or Cu on the one side, and Cd, In or Sn on the other, are characterised by the presence of electron compounds and intermediate phases; those formed by Au or Ag with Te, Pb or Bi are mainly of the eutectic type. It is known that the formation of a eutectic is associated with a positive value of

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the solution energy:

$$\epsilon = \epsilon_{AB} - \frac{1}{2} (\epsilon_{AA} + \epsilon_{BB}) \quad (11) .$$

It would appear that there is a direct relationship between the sign of ϵ and the charge of Ag and Cu in a solution. The results of the present investigation indicate that the decrease in the charge of Au and Ag is associated with the decrease in ϵ . Abnormally high values of Z^M of Au and Ag in mercury are probably associated with the specific behaviour of mercury in contact with impurities. It is known that the electrical resistivity of mercury is decreased by the addition of other metals and this effect has been attributed (Ref. 6: P. Mangelsdorf - Journ. of Chem. Phys., 1960, v.33, no. 4, 1151) to localized crystallization of mercury around the impurity atoms which can also explain the increased value of Z^M of Au and Ag in mercury. There are 2 figures, 1 table and 10 references: 4 Soviet-bloc and 6 non-Soviet-bloc. The English-language references read as follows: Ref.3: N.K.Mott, Proc.Cambridge Phil. Card 8/10 9

A study of ...

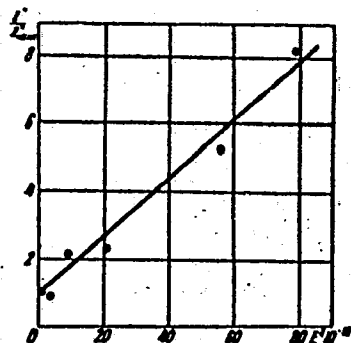
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Soc., 1936, 32, 281; Ref.6: P. Mangeladof, Journ of Chem.Phys.,
1960, v.33, no.4, 1151; Ref.10: I. Friedel, Phil.Mag., 1954, 43, 153.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: April 27, 1961

Fig.1:



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BELASHCHENKO, D.K.

Regularities of electron transfer in liquid binary metal alloys.
Izv.vys.ucheb.zav.; Chern.met. 4 no.9:5-12 '61. (MIRA 14:10)

1. Moskovskiy institut stali.
(Alloys--Electric properties)

RELASHCHENKO, D.K.

Electric transfer in diluted metallic solutions. Zhur.fiz.
khim. 35 no.8:1875-1876 Ag '61. (MIRA 14:8)

1. Moskovskiy institut stali.
(Alloys--Electric properties)

24,7700(1137,1138,1144)

27680
S/076/61/035/009/003/015
B101/B110

AUTHORS: Belashchenko, D. K., and Zhukhovitskiy, A. A.

TITLE: Theory of electric transport

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 9, 1961, 1921 - 1926

TEXT: The authors theoretically studied the electric transport in a metallic two-component system. (I) They proceed from Onsager's method and write: $J_1 = L_{11}X_1 + L_{12}X_2 + L_{13}X_3$; $J_2 = L_{21}X_1 + L_{22}X_2 + L_{23}X_3$; $J_3 = L_{31}X_1 + L_{32}X_2 + L_{33}X_3$ (1), where X are defined by:

$$X_1 = -\frac{d\mu_1}{dx} - e_1 \frac{d\phi}{dx},$$

$$X_2 = -\frac{d\mu_2}{dx} - e_2 \frac{d\phi}{dx},$$

$$X_3 = -\frac{d\mu_3}{dx} - e_3 \frac{d\phi}{dx}.$$

(2).

J_1 is the current of ions of the first type, J_2 of the second type, J_3

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is the current of electrons, e_1, e_2, e_3 are the corresponding charges, φ is the electric potential, and μ_1, μ_2, μ_3 are the chemical potentials. $\mu_3 = e_3 \varphi$. Constant temperature is assumed. For the electric neutrality, it is written down: $e_1 J_1 + e_2 J_2 + e_3 J_3 = I$ (3), where I is the external current. Substitution of Eq. (1) and (2) in (3) gives:

$$-l_1 \frac{d\mu_1}{dx} - l_2 \frac{d\mu_2}{dx} - (c_1 l_1 + c_2 l_2 + c_3 l_3) \frac{d\varphi}{dx} - c_3 l_3 \frac{d\varphi}{dx} = I, \quad (4)$$

where $l_1 = e_1 L_{11} + e_2 L_{21} + e_3 L_{31}$; $l_2 = e_1 L_{12} + e_2 L_{22} + e_3 L_{32}$; $l_3 = e_1 L_{13} + e_2 L_{23} + e_3 L_{33}$ (5). For the electric conductance κ , it is written down: $e_1 l_1 + e_2 l_2 + e_3 l_3 = \kappa$; the ionic mobility $u_i = l_i / c_i$, where c is the concentration of the respective ion in cm^{-3} . The moving force for the transport of components is, at first, not assumed to be the gradient of the chemical potential of atoms; there are two other causes: the gradient of the chemical potential of ions, and the gradient of the

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electric potential. The case $J_1 + J_2 = 0$ is studied. For the chemical potentials μ_1^* and μ_2^* of atoms, it is written down:

$$\begin{aligned}\mu_1^* &= \mu_1 + z_1 \mu_2 = \mu_1 - \frac{e_1}{e_2} \mu_2 = \mu_1 - c_1 \xi, \\ \mu_2^* &= \mu_2 + z_2 \mu_1 = \mu_2 - \frac{e_2}{e_1} \mu_1 = \mu_2 - c_2 \xi,\end{aligned}\quad (7),$$

where z_1 and z_2 are the ionic charges. Substitution of Eq. (7) in the Gibbs-Duhem equation $c_1 d\mu_1^*/dx + c_2 d\mu_2^*/dx = 0$ gives:

$$c_1 \frac{d\mu_1^*}{dx} + c_2 \frac{d\mu_2^*}{dx} = \frac{d\xi}{dx} (c_1 e_1 + c_2 e_2) \quad (8).$$

From these ansatzes, the authors derive the fundamental equation for the electric transport: $\frac{I_1}{\kappa} - J_1 = L_{11} \left(1 + \frac{c_1}{c_2}\right) \frac{d\mu_1^*}{dx} \quad (15)$, and considering that $I_1 = c_1 u_1$; $I/\kappa = E$

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(E = field intensity) they obtain: $c_1 u_1 E - J_1 = L_{11} \left(1 + \frac{c_1}{c_2}\right) \frac{d\mu_1^*}{dx}$ (15a).

For E = 0, $D = L_{11} (1 + c_1/c_2) d\mu_1^*/dc_1$ (16) and $J_1 = c_1 u_1 E - D dc_1/dx$ (16a).

With $J_1 = J_2 = 0$, $c_1 u_1 E = L_{11} (1 + c_1/c_2) d\mu_1^*/dx$ (17). If there were no interaction between the motion of ions and electrons, the following would hold: $L_{13} \ll L_{11}$, and $L_{11} = u_1 c_1 / (e_1 - e_2)$ (18). With interaction between ions and electrons, however, the behavior of the components is no longer determined by their charge alone. The "effective charge" e_1^*

is defined by:

$$u_1 = \frac{D}{kT} e_1^* \frac{d \ln c_1}{d \ln a_1} \quad (19)$$

Substitution of Eq. (19) in (16a) gives:

$$J_1 = \frac{c_1 D}{kT} e_1^* \frac{d \ln c_1}{d \ln a_1} E - D \frac{dc_1}{dx} \quad (20)$$

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and for $J_1 = 0$: $d \ln a_1 / dx = e_1^* E / kT$ (21). From Eq. (19), (16), (15), and $l_1 + l_2 = 0$, it follows: $L_{13} = -L_{23} = L_{11}/e_3 [(e_1^* - e_2^*) - (e_1 - e_2)]$ (22). Further, $c_1 e_1^* + c_2 e_2^* = 0$ (23). If there is a concentration gradient and diffusion, an additional diffusion emf is formed at the ends of the specimens. For $I = 0$,

$$\frac{d\phi}{dx} = -\frac{dE}{dx} - e_1 \frac{D}{k} \frac{dc_1}{dx} \left(1 + \frac{e_1}{e_3}\right). \quad (27).$$

(II) The steady distribution of concentrations in the electric field is calculated by the Thomson-Eastman method. Two adjacent cross sections with the concentrations c and $c + dc$ are studied. An ion with the charge e_1 is to be transported in the direction of the electric field E , an ion with the charge e_2 in the opposite direction. Then,

$$\sum_j \frac{d\mu_j}{dc_j} dc_j - T dS_n = 0. \quad (28),$$

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where dS_p is the "transport entropy". Further,

$$\frac{d\mu_1}{dc_1} dc_1 - \frac{d\mu_2}{dc_2} dc_2 - T dS_p = 0. \quad (29)$$

The authors pass over to the potentials of atoms, and obtain:

$$\left[\left(1 + \frac{c_1}{c_2} \right) \frac{d\mu_1^*}{dc_1} + (c_1 - c_2) \frac{d\phi}{dc_1} \right] dc_1 = T dS_p. \quad (A)$$

The "transport heat" TdS_p consists of two components: (a) Due to a change of the chemical potential of electrons along the specimen, the following work is done: $(e_1 - e_2) d\phi$; (b) the ionic transport and the electron current perform the work $(e_1^* - e_2^*) Edx$. Hence,

$$\left[\left(1 + \frac{c_1}{c_2} \right) \frac{d\mu_1^*}{dx} + (c_1 - c_2) \frac{d\phi}{dx} \right] dc_1 = (c_1 - c_2) d\phi + (e_1^* - e_2^*) Edx. \quad (30)$$

and

$$E = \frac{1 + \frac{c_1}{c_2} \frac{d\mu_1^*}{dx}}{c_1 - c_2}. \quad (31)$$

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Substitution of Eq. (23) in Eq. (31) gives Eq. (21) derived according to Onsager. Conclusion: The effect of the electric transport acting in the direction of the electric field and in opposite direction does not only depend on the charges of the ionic components but also on their interaction with the current of conduction electrons. Papers by S. I. Drakin (Zh. fiz. khimii, 27, 129, 1955) and B. Baranovski (Roczn. Chem., 29, 129, 1955) are mentioned. There are 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: May 25, 1959

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BELASHCHENKO, D.K.; BOKSHTEYN, B.S. (Moscow)

Theory of electrical transport. Multicomponent metallic systems.
Part 2. Zhur.fis.khim. 35 no.10:2228-2233 0 '61. (MIRA 14:11)
(Electrochemistry) (Systems (Chemistry))

35222

S/148/62/000/001/007/015
E039/E420

/s. 810°

AUTHORS: Belashchenko, D.K., Grigor'yev, G.A.

TITLE: The electromigration of admixtures of thallium and cobalt in liquid metal solutions

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy.
Chernaya metallurgiya, no.1, 1962, 124-130

TEXT: The electromigration method has been used previously in the investigation of the properties of metallic alloys and the nature of the interaction between their components. Alloys of the metals Cd, Sn, Pb, Bi, etc have been examined, and also with admixtures of Ag and Au. A relation was obtained giving the effective charge of any component in binary dilute solutions. This relation was shown to be valid for the non-transition metals of the middle of the periodic system. A modified form of this relation is also valid for dilute solutions of Cd, Sn, Pb, Bi in each other but not for admixtures Ag and Au in Cd, Tl, Sn, Pb and Bi. Ag and Au form intermetallic systems with metals of the 5th group (Cd, In, Sn) but form eutectics with metals of the 6th group (Pb, Tl, Bi). It is of interest to examine the behaviour of transition and anomalous metals in solution and in Card 1/4

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The electromigration ...

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this paper is investigated the behaviour of admixtures of Tl and Co in metals of the 5th and 6th groups by means of electromigration. Thallium has a number of anomalous physical and chemical properties; although it is in the 3rd group of the periodic table its chemical properties are similar to the alkali metals. Cobalt was chosen because it dissolves sufficiently well in easily melted metals. The electromigration was performed in thin-walled glass capillary tubes (~1 mm diameter, 40 mm long) with molybdenum electrodes at the ends. The samples were maintained at 350°C and a constant current of 1.0 to 1.5 A passed through them until equilibrium was achieved (10 days). The distribution of the admixture in the sample was then fixed by rapidly cooling in oil. It was then cut into short lengths and analysed radiometrically. This was done by using the radioactive isotopes Tl^{204} and Co^{60} in the admixture. Values of the effective charge on the admixture of Tl and Co were determined by the equation

$$\frac{d \ln c}{dx} = \frac{eEZ^*}{kT}$$

(3)

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The electromigration ...

where c is concentration of the admixture and is proportional to the specific radioactivity of the sections of sample;
 x is length coordinate; E the strength of the electric field;
 e is charge of the electron; k is the Boltzman constant and
 T the temperature. The following values were found, using Eq.(3):

	5th group			6th group	
	Cd	In	Sn	Pb	Bi
Z^x Thallium	-2.1	-1.5	-1.3	+0.4	+0.2
Z^x Cobalt	-22	-12	-6.0	-11	-1.2

The interactions in these solutions are discussed in detail and it is shown that the transition and non-transition metals can be described using one relation. The development of the ideas in this paper are largely based on assumptions and further work is necessary to confirm them, particularly on electromigration of the transition metals and other properties of solutions.
There are 2 figures and 1 table.
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The electromigration ...

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E039/E420

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: October 17, 1961

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X

39068
S/148/62/000/005/005/009
E202/E492

18.7.40

AUTHOR: Belashchenko, D.K.

TITLE: Electrophoresis in liquid binary alloys and its connection with electrical resistance

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no.5, 1962, 120-130

TEXT: Earlier work (Izv. VUZ Chernaya metallurgiya, no.9, 1961) on the electrophoresis of components in the liquid alloys of the Cd-Sn system is extended to Cd-Pb system and attempts are made to find whether this kind of electrophoresis is a "structurally sensitive" property. The latter problem is studied on the Au(ϕ)-Sn(ϕ) system. A capillary method was used of which details were given by the present author and G.A.Grigor'yev (Izv. VUZ. Chernaya metallurgiya, no.11, 1961). In the case of Cd-Pb, 1 mm inner diameter molybdenum glass capillary was filled under vacuo with approximately eutectic composition, the thread being approximately 40 mm. The experiments were conducted in a vertical tube furnace at 350°C. The specimens were kept under 1 A current for 10 days to reach the stationary state, y
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the heavier (Pb) migrating downwards. Finally, the column of metal was divided into 3 mm long cylinders and analysed by distilling the Cd off. The concentrations were evaluated in terms of the respective activities and the charge z^* of Pb was calculated from

$$\frac{d \ln a_{Pb}}{dx} = \frac{e E z_{Pb}^*}{kT} \quad (4)$$

where x is the coordinate of length, e the electron charge, E field potential at a given cross-section, k Boltzmann constant and T absolute temperature. Two identical samples were studied and the results plotted. The effective charges of lead in the above alloys were found to be

atomic fraction of Pb	0.2	0.3	0.4	0.5	0.6	0.7	0.8
z^*_{Pb} (effective charge)	-2.23	-1.66	-1.29	-0.88	-0.72	-0.48	-0.25

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The results confirmed that electrophoresis in simple eutectic systems having approximately linear distribution of the electric resistance isotherms is determined (to the first order of approximation) only by the Group Number of the Periodic Table and depends very little on the individual ionic properties. The system Au(1)-Sn(2) was studied in a similar fashion but with suitably adjusted working parameters. The gravimetric analysis in this case was by means of cupellation which lowered inevitably the overall accuracy (the total error in the $z^*(\text{Au})$ determination was approximately 30%). It was concluded that the effects of the electrophoresis in the Au-Sn system were considerably weaker than in the Cd-Pb system. Finally, general relations between electrical conductivity and electrophoresis were developed on the basis of the diffusion cross-section obtained during electrophoresis, the conditions imposed by fully degenerated electron gas and the spherical symmetry of the Fermi surface. The electroconductivities obtained from the above were compared with those measured in liquid alloys showing (with some notable exceptions) close agreement, proving thereby that the relations of

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diffusion cross-sections of the conductivity electrons on ions of the components are similar in both the electroconducting and electrophoretic phenomena. Detailed studies on K-Na system at 100°C, based largely on available data (S.I.Drakin, A.K.Mal'tsev. ZhFKh, 31, no.9, 1957, 2036-2040) showed similarities to the solid solution systems, the most characteristic phenomenon being the presence of the residual resistivity due to the additional diffusion. Although a number of relations were established they were considered to be very approximate, being based on a very simplified model of the electrons-ions interaction in a liquid alloy. There are 6 figures and 2 tables.

ASSOCIATION: Moskovskiy institut stali
(Moscow Steel Institute)

SUBMITTED: October 26, 1961

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X

S/148/62/000/007/003/005
E193/E383

AUTHORS: Grigor'yev, G.A. and Belashchenko, D.K.

TITLE: Electrotransport of nickel additions in molten metals

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, no. 7, 1962, 137 - 139

TEXT: In continuation of their earlier work (Izv. vuzov Chernaya metallurgiya, no. 1, 1962) the authors determined the effective charges of Ni ions in molten Cd, In, Sn and Bi by studying the electrotransport of Ni in these metals. The experimental technique consisted briefly of the following: a DC of 1 A was passed through the experimental alloy containing up to 0.1% Ni⁶³ placed in evacuated capillaries and held for 10 days at 350 °C, this period of time being sufficient to attain steady conditions; after each test the distribution of nickel concentration in the alloy was determined by measuring the radioactivity of salts obtained after dissolving samples of the alloy taken from various portions of solidified specimens.

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The results can be summarized as follows: 1) the effective charge z_{Ni}^+ of nickel in all the metals studied is negative (i.e. the Ni migrates towards the anode). 2) z_{Ni}^+ is a hyperbolic function of ^{the group number of} the solvent metal, its values in Cd, In, Sn and Bi being -8.5, -4.7, -2.8 and -0.7, respectively. 3) The z_{Co}^+/z_{Ni}^+ ratio corresponds qualitatively to the ratio of the number of unfilled states in the third shells of these elements. The high values of effective charges of Co and Ni are associated with increased scattering of the conduction electrons on unfilled states. There are 1 figure and 1 table.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow
Institute of Steels and Alloys)

SUBMITTED: March 22, 1962

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24.7000

S/181/62/004/007/005/037
B102/B104

AUTHORS: Bokshteyn, B. S., Belashchenko, D. K., and Zhukhovitskiy, A.A.

TITLE: Surface diffusion study in powders by the method of the electro-diffusion potential

PERIODICAL: Fizika tverdogo tela, v. 4, no. 7, 1962, 1728 - 1734

TEXT: Owing to the smallness of the diffusion current it is difficult to study surface diffusion experimentally. A new and simpler method is suggested, based on electric measurements. The activation energy of surface diffusion can be determined from the temperature dependence of the electro-diffusion potential. This potential was measured, in the range 210 - 310°C, for diffusion of tin into pressed nickel powder. That substance and temperature interval were chosen because the volume diffusion coefficient for them is less than 10^{-20} cm²/sec, so that virtually no tin penetrates into the Ni grain volume. The mean grain size was 10⁻² cm. The grains were porous (10-volume %, pore size 10⁻⁵ cm), the pressed samples (cylinders of 10 mm diameter and 5 mm height) having porosity of about 45%. The Card 1/3

Surface diffusion study ...

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measurements were made at 210, 240, 270 and 310°C. Temperature dependence of the electrodiffusion potential, that of the diffusion coefficients, and the dependence of the Sn concentration on the penetration depth are given graphically and numerically. The activation energy of the Sn surface diffusion was $Q=12,000$ cal/g-at, the range of error around 20%. Control measurements were carried out with radioactive isotopes ($\text{Sn}^{115/123}$). The initial activity of the tin foil was 50,000 pulses/min, the penetration depth into the grain volume determined from the activity was about 1 \AA , $Q = 11,000$ cal/g-at. The penetration depth, x , is proportional to \sqrt{Dt} (where D is the diffusion coefficient) and, if $x \ll 2\sqrt{Dt}$, then $c/c_0 = 1 - x/\sqrt{\pi Dt}$; or, since c_0 is unknown, $\ln c/c_0 \approx -x/\sqrt{\pi Dt}$; $\log c$ plotted versus x gives straight lines with the angle of inclination α . If $\alpha \ll 1$, then $D = 0.19/\pi t \tan^2 \alpha$. $Q=11,000$ cal/g-at is found from the slope of the straight line $\log D = f(1/T)$, which is in good agreement with the value obtained from electrodiffusion potential measurements. The measurements also show that surface diffusion takes place not only on the surface but also in a layer having a thickness of $\approx 250 \text{ \AA}$ which considerably exceeds that of the Card 2/3

Surface diffusion study ...

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lattice constant. There are 3 figures and 3 tables.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: June 22, 1961 (initially), January 18, 1962 (after revision)

✓B

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BELASHCHENKO, D.K.; ZHUKHOVITSKIY, A.A.

On the comments by B. Baranovskii and A. TSkurovskii. Zhur.
fiz. khim. 36 no.9:2098 S '62. (MIRA 17:6)

S/076/62/036/011/012/021
B101/B180

AUTHOR: Belushchenko, D. K.

TITLE: Theory of electron transfer. III. Effect of the short-range order in molten alloys on electron transfer

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 11, 1962, 2496-2499

TEXT: Using the Debye-Falkenhagen method, the author studied the effect on electron transfer of the statistical correlation in a binary metallic solution. The following first-approximation equation is found for the effect of short-range order on the first coordination sphere of an ion:

$$e_i^{**} = e_i^* [1 + (kT/D)(s\delta/4\pi\eta r_c)(c_1/c_2)] \quad (16).$$

e_i^{**} is the experimentally determined, apparent effective charge of the ion, e_i^* its effective charge, D the diffusion coefficient, s the coordination number, δ the correlation parameter, η the viscosity, r_c the radius of the first coordination sphere, c_1 , c_2 the atomic fractions of the solution

Card 1/2

Theory of electron transfer...

S/076/62/036/011/012/021
B101/B180

components. A further simplification gives $e_i^{**} = e_i^*(1 + 2\Delta H/3RT)$, where ΔH is the heat of mixing per gram atom of the alloy. Eq. (16) can be used to find out whether there are inhomogeneities in eutectic alloys near the melting point. The results are only useful if δ is small. Where there is intense interaction between the alloy components, e_i^* changes, complexes are formed, and the model suggested can no longer be used. The most important English-language reference is: P. C. Mangelsdorf, J. Chem. Phys. 33, 1151, 1960.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: November 1, 1961

Card 2/2

BELASHCHENKO, D.K.; GRIGOR'YEV, G.A.; ZHURAVSKA, V.; MIZERA, E.

Electron transfer in liquid binary metal systems. Izv. vys. ucheb.
zav.; Chern. met. 6 no.7:155-159 '63. (MIRA 16:9)

1. Moskovskiy institut stali i splavov.
(Liquid metals---Testing) (Electrons)

BELASHCHENKO, D.K.; Primalni uchastnye: LI VEN'-CHAO [Li Wēn-ch'ao]
student; U TI-YAN' [Wu T'i-yen] student; CHZHAN TIN'-KHUA
student; CHZHAN YUY-ZHUN [Chang Yü-jung] student; CHZHAN ZHUN-
SHEN [Chang Jung-shēng] student

Quasi-stationary method of determining the concentration
dependence of diffusion coefficients in metallic melts.
Zhur. fiz. khim. 36 no.9:2055-2058 S '62. (MIRA 17:6)

1. Moskovskiy stali i splavov.

BELASHCHENKO, D.K.; GRIGOR'YEV, G.A.

Effect of isotope separation during electron transfer in
liquid metals. Zhur. fiz. khim. 37 no.4:929 Ap '63.

(MIRA 17:7)

L 9901-63 EWT(1)/EWG(k)/EWP(q)/EWT(m)/EDS/EEC(b)-2--AFFTC/ASD/ESD-3--
 PE-4--AT/IJP(C)/JD
 ACCESSION NR: AP3000422 S/0076/63/037/005/1126/1129

AUTHOR: Belashchenko, D. K.; Juny-Sheng 18 76

TITLE: Transfer of electricity in liquid alloys on a base of transition metals

SOURCE: AN SSSR. Zhurnal fizicheskoy khimii, v. 37, no. 5, 1963, 1126-1129 27

TOPIC TAGS: Cd, In, Sn, Tl, Pb, Bi, Ni, Fe, C, Mn, transfer of electricity

ABSTRACT: Authors briefly describe some studies which were heretofore conducted concerning electric transfer of various elements in lowmelting elements such as Cd, In, Sn, Tl, Pb, Bi. Authors then give a description of experiments which they performed dealing with the transfer of electricity in alloys on a base of Fe and Ni. An apparatus for studying transfer of electricity in liquid alloys at temperature of 1500-1600° was built. Electric transfer in weak solutions of C, Mn, Fe, and Ni in liquid Fe and Ni was studied. "Hole wind" has a decisive bearing on the transfer of electricity in these systems. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute for Steels and Alloys)

SUBMITTED: 29Apr62

DATE ACQ: 19Jun63

ENCL: 00

SUB CODE: 1100

NR REF SOV: 008

OTHER: 000

Card 1/1

ACCESSION NR: AP4013303

8/0032/64/030/002/0186/0190

AUTHORS: Rotin, V. A.; Belashchenko, D. K.; Bokshteyn, B. S.; Zhukhovitskiy, A. A.

TITLE: Method of determining electron diffusion potentials in binary melts of metals

SOURCE: Zavodskaya laboratoriya, v. 30, no. 2, 1964, 186-190

TOPIC TAGS: diffusion potential, electron diffusion, eutectic diagram, glass capillary, quenching oil bath, metallic melt

ABSTRACT: The electron diffusion in two types of alloys has been determined: alloys with simple eutectic diagrams and slight departures from ideal solutions (Pb-Sn, Bi-Sn, Bi-Cd) and alloys with fixed chemical composition but with large departures from laws of ideal solutions (Na-Tl and Bi-Te). The two metals were placed in a glass capillary and separated by means of 1-2 mm molybdenum solder. The capillary was placed in a quenching oil bath to keep the thermal emf of both metallic melts identical. The resulting diffusion potential was measured using a Gerts type 167300 high-sensitivity galvanometer with low input resistance. For large specimen impedances an M-95 galvanometer was used. The measurements indicated

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ACCESSION NR: AP4013303

a wide range of potential outputs, from a minimum of 5 μ kv for Pb-Sn to 100 μ kv for Na-Tl and Bi-Te systems. Orig. art. has: 4 figures, 3 tables, and 2 formulas.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steels and Alloys)

SUBMITTED: 00

DATE ACQ: 26Feb64

ENCL: 00

SUB CODE: ML

NO REF SOV: 005

OTHER: 001

Card 2/2

BELASHCHENKO, D.K.

Possible mechanism for thermal diffusion in metallic solutions.
Zhur. fiz. khim. 38 no.3:565-570 Mr '64. (MIRA 17:7)

1. Moskovskiy institut stali i splavov.

BELASHCHENKO, D.K.

Application of the electrotransfer method for studying the
thermodynamic properties. Zhur. fiz. khim. 38 no.9:2286-2290
S '64. (MIRA 17:12)

1. Moskovskiy institut stali i splavov.

BELASHCHENKO, D.K.

Electrolytic migration in liquid metals. Usp.khim. 34 no.3:530-564
Mr '65. (MIRA 18:4)

1. Moskovskiy institut stali i splavov.

BELASHCHENKO, D.K.

Mechanism of electroosmosis in liquid metals. Zhur. fiz. khim. 39
no.3:808-809 Mr '65. (MIRA 18,7)

1. Moskovskiy institut stali i splavov.

BELASHCHENKO, D.K.

Structure of liquid eutectics. Zhur. fiz. khim. 39
no.6:1331-1337 Je '65. (MIRA 18:11)

1. Moskovskiy institut stali i splavov. Submitted Oct.
31, 1963.

BELASHCHENKO, D.K.

Transfer phenomena in solutions with the components present in
several different states. Zhur.fiz.khim. 39 no.7:1700-1707 J1
'65. (MIRA 18:8)

1. Moskovskiy institut stali i splavov.

L 09152-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP7002757

SOURCE CODE: UR/0364/66/002/008/0906/0913

BELASHCHENKO, D. K., MAGIDSON, I. A., BELASHCHENKO, G. I., And LYAPUNOVA, L. G.
Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

43

"Migration Phenomena in Semiconducting Melts of Thallium Sulfides and Selenides

Moscow, Elektrokhiimiya, Vo 2, No 8, 1966, pp 906-913

ABSTRACT: In an experimental cell of the liquid semiconductor-neutral metallic electrode type, concentration and temperature dependence of the mean coefficient of diffusion of the solution and apparent effective charges of components in melts of the Tl-S and Tl-Se systems exhibiting semiconductor properties were investigated. A discussion of the results was based on the theory of polygenic solutions, the components of which can be in different states of aggregation. The contribution of the ionic and electron-vacancy components to total electroconductivity of the melts investigated was evaluated. It was found to depend on melt temperature and composition. A conclusion was drawn as to the features of the reaction in the melts of those compounds characterized by relatively high electroconductivity of an electronic nature and by a predominantly ionic bonding between solution molecules. Orig. art. has: 6 figures, 14 formulas and 6 tables. [JPRS: 38,139]

TOPIC TAGS: semiconducting material, semiconductor conductivity

SUB CODE: 20 / SUBM DATE: 12Jul65 / ORIG REF: 010 / OTH REF: 003

not

UDC 541.13:621.315.592

0925

163

ACC NR: AP6029681

SOURCE CODE: UR/0369/66/002/004/0415/0421

AUTHOR: Belashchenko, G. I.; Zhukhovitskiy, A. A.

ORG: Institute of Steel and Alloys, AN SSSR, Moscow (institut stali i spavov AN SSSR)

TITLE: The forces arising upon action of admixtures on polycrystalline thin copper wires v1

SOURCE: Fiziko-khimicheskaya mekhanika materialov, v. 2, no. 4, 1966, 415-421

TOPIC TAGS: copper wire, thin wire, polycrystalline structure, crystal structure, creep, stress analysis, copper alloy

ABSTRACT: In order to study processes which take place on the internal surfaces of division boundaries in studying surface tension of solids, experiments were performed on the measurement of surface tension of solid copper under the influence of various additives. The surface tension of pure copper wire was first measured by stretching the wires under defined load at 1050 C in a vacuum of 10^{-4} mm Hg. The surface tension was found to be 900—1200 erg/cm². Then, after applying admixtures directly onto the wire (Sn, Ga, Ag) or applying the admixtures to the wire as a vapor (Ag, Sb, Pb, B), the experiments were repeated in an atmosphere of helium. It was found that in the presence of tin a force arises which counteracts extension of the wire and may even cause a shortening of the wire, even against a considerable load. This process, found to be an activation process, is rather widespread for various additives. In addition

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ACC NR: AP6029681

to the shortening, in all cases an increase in the creep rate under the influence of the additives was noted. Some of the effects noted were caused by displacement of copper atoms, superequivalent displacement, and by the atoms of the additive. The displaced copper atoms migrate inward and reduce vacancies in a certain layer near the boundary, causing it to become effectively compressed. The results show that a study of creep of thin wires can produce characteristics not only of the external but also the internal boundaries of a solid. Orig. art. has: 6 formulas and 8 figures.

SUB CODE: 11/ SUBM DATE: 16Aug65/ ORIG REF: 006/ OTH REF: 006

Cord 2/2

L 09152-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP7002757

SOURCE CODE: UR/0364/66/002/008/0906/0913

BELASHCHENKO, D. K., MAGIDSON, I. A., BELASHCHENKO, G. I., And LYAPUNOVA, L. G.,
Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov) 43

"Migration Phenomena in Semiconducting Melts of Thallium Sulfides and Selenides
 Moscow, Elektrokhiimiya, Vo 2, No 8, 1966, pp 906-913 27 27 27

ABSTRACT: , In an experimental cell of the liquid semiconductor-neutral metallic electrode type, concentration and temperature dependence of the mean coefficient of diffusion of the solution and apparent effective charges of components in melts of the Tl-S and Tl-Se systems exhibiting semiconductor properties were investigated. A discussion of the results was based on the theory of polygenic solutions, the components of which can be in different states of aggregation. The contribution of the ionic and electron-vacancy components to total electroconductivity of the melts investigated was evaluated. It was found to depend on melt temperature and composition. A conclusion was drawn as to the features of the reaction in the melts of these compounds characterized by relatively high electroconductivity of an electronic nature and by a predominantly ionic bonding between solution molecules. Orig. art. has: 6 figures, 14 formulas and 6 tables. [JPRS: 38,139]

TOPIC TAGS: semiconducting material, semiconductor conductivity

SUB CODE: 20 / SUBM DATE: 12Jul65 / ORIG REF: 010 / OTH REF: 003

Copy 1 of 1

UDC 541.13:621.315.592

0125

1631

3 (7)

AUTHORS: Burtsev, D. A., Belashchenko, N. A. SOV/50-59-8-9/19

TITLE: Thunderstorm With Snow in the Crimea (Groza so snegom v Krymu)

PERIODICAL: Meteorologiya i gidrologiya, 1959, Nr 8, p 32 (USSR)

ABSTRACT: On January 12, 1959, the formation of cumulo-nimbus clouds accompanied by snowfall, which at times limited visibility to 200-500 m, was observed for some hours in Simferopol'. The shower clouds originated rapidly, and were destroyed just as rapidly. The interval between individual "charges" amounted to 30-35 minutes at the most. Thunder was heard some times at mid-day. Precipitation fell in the form of a downpour-snowfall and frozen-fog grains. Since the beginning of regular meteorological observations in Simferopol' in 1891, a thunderstorm in January was recorded only 3 times. The winter thunderstorms in the Crimea were only observed at the polar fronts at the outlet of southern cyclones, and were accompanied by downpours. On January 12, 1959, the Crimea and the adjoining area were in the rear of the depression, in forced-in masses of former arctic air. The data of the radio sounding in Simferopol' at 9.15 hours on that day showed a moist-labile state of the atmosphere in the layer of from 1090 to 3200 m. The pilot-

Card 1/2

Thunderstorm With Snow in the Crimea

SOV/50-59-8-9/19

balloon data showed at 15 hours a "gap" on the wind vector in the layer up to 1000 m; at an altitude of 400 m, the direction was recorded with 332° , and the velocity with 6 m/sec, whereas at an altitude of 1000 m the direction was determined with 261° and the velocity with 17 m/sec. Higher up, the wind changed little with the altitude. To clarify the possibility of a formation of a turbulent mixture in the lower layers in the kind shown in paper (Ref 1), the thermal equivalent of the vertical gradient of the wind vector was calculated, and the "thermodynamic" curve was plotted. The result showed a dry-labile state of the atmosphere in the layer of 0-700 m with a condensation level at an altitude of 550 m, a moisture-neutral state in the layer of 700-1090 m, and a moisture-labile state in the layer from 1090 to 3200 m. Consequently, the great dynamic turbulence in the lower kilometer could form a thrust sufficient to overcome the labile state and to form the cumulo-nimbus clouds. The intrusion of cold air disturbed the day-temperature course, but the moving air itself was heated in the day-hours which also favored the formation of convection. South of Simferopol, there are the Mountains, and the current coming from north had to undergo a "rising motion which also intensified convection. There is 1 Soviet reference.

Card 2/2

BELASHCHENKO, T., kapitan 3-go ranga.

A close-knit and efficient team. Komm.Vooruzh.Sil 1 no.6:
73-76 D '60. (MIRA 14:8)
(Submarine boats) (Naval discipline)

BELASHCHENKO, T.

AID P - 2229

Subject : USSR/Aeronautics

Card 1/1 Pub. 58 - 12/19

Author : Belashchenko, T.

Title : The moral face of American flyers

Periodical: Kryl. rod., 5, 21-22, My 1955

Abstract : Anti-American propaganda directed mainly against the
Army and the Air Force.

Institution: None

Submitted : No date

BELASHCHENKO, T.K.

LUKANIN, Ye.A., polkovnik; CHEREDNICHENKO, V.T., polkovnik; LESNEVSKIY, S.A., polkovnik; KOLOTOV, V.I., kapitan 1 rango; KORKESHKIN, A.P., polkovnik; POROFONOV, I.F., podpolkovnik; ROZANOV, I.S., podpolkovnik; LISENKOV, M.M., podpolkovnik; SAPRONOV, A.T., mayor; BELASHCHENKO, T.K., mayor; SKAPENKOVA, T.N.; SOROKINA, L.D.; ZOTOV, M.M., polkovnik, red.; MYASHNIKOVA, T.F., tekhn.red.

[Material for political studies; a manual for group leaders]
Materialy k politicheskim saniatliam v pomoshch' rukovoditeliam
grupp. Moskva, Voen.isd-vo M-va obor. SSSR, 1958. 199 p. (MIRA 11:5)

1. Russia (1923- U.S.S.R.) Armiya. Upravleniye propagandy i
agitatsii. 2. Voennoy otdel Gosudarstvennoy biblioteki imeni
V.I.Lenina (for Skapenkova, Sorokina)
(Russia--Army--Education, Nonmilitary)

BELASHCHENKO, T.K., kapitan 2-go ranga

Racism at the service of American military circles. Mor. sbor.
47 no.11:81-86 N '63. (MIRA 16:11)

BELASHCHENKO, Tom Kirillovich, kapitan 2 ranga; RZHEVSKIIY, Oleg Aleksandrovich, podpolkovnik; SHEVCHENKO, A.M., general-mayor, red.; LISENKOV, M.M., polkovnik, red.

[The U.S. Army as it is] Armia SShA kak ona est'. Moskva, Voenizdat, 1965. 142 p. (MIRA 18:3)

BELASHEV, G. A.

BELASHEV, G.A., dots., kand. ekon. nauk.

Technical progress in the food industry of the U.S.S.R. Trudy
MTIPP no.7:7-20 '57.

(MIRA 10:12)

(Food industry)

BEKASHEV, G.A.

BEKASHEV, G.A., dots., kand. ekon. nauk.

Geographical distribution of the food industry of the U.S.S.R.
Trudy MTIPP no.7:190-207 '57. (MIRA 10:12)
(Food industry)

BELASHEV, V.

484

O merakh [povysheniya] material' noy
zainteresovannosti kolkhozov i kolkhoznikov uvelichenii
proizvodstva konopli. Nal'chik, Kabard. kn. izd., 1954
24 s. 22sm. 2.000 eks. 35 k.- [54-54375] p
338.1:633.522(47)

SO: Knizhnaya Letopis, Vol. 1, 1955

BELASHEV, V.A.

Shortcomings in regulations for the technical operation of hemp plants. Tekst. prom. 17 no.4:64-66 Ap '57. (MIRA 10:4)

1. Upravlyayushchiy Kabardinakim meshoblastnym pen'kotrestom.
(Hemp) (Textile factories)

YASHUNSKAYA, A.G.; KONOVALOVA, Ye.M.; BELASHEVA, T.P.

Simplified method for determining the degree of polymerization
of alkali cellulose. Khim. volok. no.2:31-33 '65.

(MIRA 18:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo
volokna.

GOL'DSHEYN, M.N., prof.; ZHEREBTSOV, I.V.; TOL'SKAYA, S.Ye.; FRISIMAN, M.A.;
LEVANKOV, I.S.; ROZENBERG, A.M.; BELASHOV, D.A.; TSERKOVNITSKAYA, A.I.;
LAPIDUS, L.S.; YAKOVLEV, B.V.; GUBENKO, Ye.N.; VICHEREVIN, A.Ye., red.

[Preventing the deformation of tracks and structures overlaying
mine workings.] Preduprezhdenie deformatsii puti i sooruzhenii nad
shakhtnymi podrabotkami. Moskva. Transport, 1964. 65p. (Voprosy
geotekhniki, no.8) (MIRA 18:2)

BELASHOV, D.A.

They are the leaders of competition. Put' i put.khoz. 5
no.11:4-5 N '61. (MIRA 14:12)

1. Glavnyy inzhener sluzhby puti, g. Donetsk.
(Socialist competition)
(Railroads--Employees)

BELASHOV, D.A.

Improved method of rail welding. Put' 1 put.khoz. 5 no.12:15 D
'61. (MIRA 15:1)

1. Glavnyy inzh. sluzhby puti, g. Donetsk.
(Railroads--Rails--Welding)

HELASHOV, G.A., dotsent, kandidat ekonomicheskikh nauk.

Ways of speeding up the turnover of working capital in the
feed industry of the U.S.S.R.. Trudy MTIPP 2:295-302 '52.
(Feed industry) (MIRA 9:2)

BELASHOV, G. A.

USSR/Geophysics - Irrigation, Underground Feb 53

"Underground Irrigation," G. A. Belashov, Cand
Econ Sci

Nauk i Zhizn, No 2, pp 11-12

States that more than 28 million hectares of dry land will be irrigated by new method of underground irrigation called underground condensation which was developed by V. G. Kornev and is based on the utilization of water vapor circulation occurring in the soil. Theoretical basis for this process was developed by Prof A. V. Lyvkov, winner of a Stalin prize.

271F76

LYKOV, A., doktor tekhnicheskikh nauk, laureat Stalinskoy premii;
BELASHOV, G., kandidat ekonomicheskikh nauk.

Technology of drying processes. Tekh.mol.22 no.4:16-18 Ap '54.
(MLRA 7:4)
(Drying apparatus)

~~RELASHOV~~, G.A., kandidat ekonomicheskikh nauk.

White bread from rye. Nauka i shizn' 22 no.1:34 Ja'55.
(Bread)(Rye) (MIRA 8:2)

BELASHOV, G. A.

"Forty Years of the Food Industry in the USSR".

Die Lebensmittelindustrie (The Food Industry), Vol V, No 2, Berlin,
Feb 58, pp 83-86.

Trans: JPRS (NY)-676

BELASHOV, G., kand. ekon. nauk; KOZIN, A.; LYASHENKO, P.; FILIPPOV, G., dots.

"Economics, organization, and planning of grain milling" by D.N. Gavrichenkov. Reviewed by G. Belashov and others. Muk. elev. prom. 24 no.11:31-32 N '58. (MIRA 11:12)

1. Moskovskiy tekhnologicheskii institut pishchevoy promyshlennosti (for Belashov, Filippov). 2. Direktor Leningradskogo mel'nichnogo kombinata im. S.M. Kirova (for Kozin). 3. Nachal'nik Planovogo otdela Moskovskogo mel'nichnogo kombinata No.3 (for Lyashenko).
(Grain milling)
(Gavrichenkov, D.N.)

BELASHOV, L.A., gornyy inzh.-ekonomist

Technical justification of an efficient organization of cyclic
operations in mines worked with cutter-loaders. Ugol' Ukr. 5 no.2:36-39
P '61. (MIRA 14:3)

(Time study) (Coal mining machinery)
(Coal mines and mining—labor productivity)

БЕЛАШОВ, П.З.

BELASHOV, P.Z., veterinarnyy vrach.

Veterinary services for fish farms. Veterinariia 34 no.9:35-37
S '57. (MLRA 10:9)

1. Upravleniya veterinarii glavnoy inspeksii po zhivotnovodstvu
Ministerstva sel'skogo khozyaystva RSFSR.
(Fishes--Diseases and pests)

BELASHOV, T.N.

Root systems of European melons. Trudy po prikl. bot., gen. 1 ser.
32 no.3:247-253 '59. (MIRA 14:5)
(Melons) (Roots (Botany))

BELASHOV, V.L., inzh.; DENISOV, I.P.

Three planting along automobile highways in the Russian Federation.
Avt.dor. 24 no.4:15-16 Ap '61. (MIRA 14:5)
(Roadside improvement)

GRIDUNOV, A.; BELASHOV, V.

Furthering advanced practices, introducing new technology. Avt.dor.
24 no.4:29-30 AP '61. (MIRA 14:5)
(Highway research)

GRIDUNOV, A.; BELASHOV, V.

Devices designed by the Central Research Laboratory of the
Main Highway Administration. Avt.dor. 25 no.8:3 of cover Ag
'62. (MIRA 16:2)

(Measuring instruments)

BELASHOV, Viktor Lukich; GRIDUNOV, Aleksandr Stepanovich; IGOLKIN,
V.N., red.; KOVRIZHNYKH, L.P., red. izd-va; GALAKTIONOVA,
Ye.N., tekhn. red.

[Road signs with light-reflecting surface]Dorozhnye znaki so
svetootrazhaiushchei poverkhnost'iu. Moskva, Avtotransizdat,
1962. 18 p. (MIRA 15:9)

(Traffic signs and signals)

BELASHOV, Yu.G.; BELASHOVA, L.V.

Electroconductivity and light transmittance of thin layers of
certain intermetallic compounds of antimony. Opt.i spektr. 11
no.4:523-526 0 '61. (MIRA 14:10)

(Antimony compounds--Electric properties)

(Antimony compounds--Optical properties)

BELASHOV, Yu.G.; BELASHOVA, L.V.

Electroconductivity and light transmittance of thin layers of
certain intermetallic compounds of antimony. Opt.i spektr. 11
no.4:523-526 0 '61. (MIRA 14:10)

(Antimony compounds--Electric properties)

(Antimony compounds--Optical properties)

PETRECHUK, O. P.; LAVRENKO, R. F.; DROZDOVA, B. M.; BELASHOVA, M. A.

"On the chemical composition of cloud water."

paper to be presented at Symp on Atmospheric Chemistry, Circulation & Aerosols,
Visby, Sweden, 18-25 Aug 1965.

Hydrometeorological Service USSR.

BELASHOVA, V.S.

Methods of fixing and keeping bats in laboratory. Trudy Inst.
zool. AN Kazakh. SSR 22:215-216 '64.

(MIRA 17:12)

BELATOV, N. D. and KESSENIKI, V. N.

"The Continental Effect in the Geographic Distribution of the electron
Concentration in the F₂-Layer," Dokl. AN SSSR, 45, No. 6, pp234-37, 1944

BELAU, K.Z., meditsinskaya sestra (Moakva)

Medical manipulation on infants. Med. sestra 15 no.3:17-18 Mr '56.
(PEDIATRIC NURSING) (MIRA 9:6)

RYUMIN, G.M.; KANDALOVA, V.D.; BELAU, R.M., NAGIYEV, M.F., red.

[Effectiveness of complex petrochemical enterprises of
Transcaucasia] Effektivnost' kompleksnykh neftekhimicheskikh
proizvodstv Zakavkaz'ia. Baku, Izd-vo AN Azerbaidzhanskoi
SSR, 1965. 93 p. (MIRA 18:11)

SOV/137-59-3-7265

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 329 (USSR)

AUTHORS: Belau, R. N., Prokopyeva, K. A.

TITLE: Determination of Hydrogen, Oxygen, and Nitrogen in Steel (Opredeleniye vodoroda, kisloroda i azota v stali)

PERIODICAL: Tekhn.-ekon. byul. Sovnarkhoz Kranoyarskogo ekon. adm. r-na, 1958, Nr 4-5, pp 44-46

ABSTRACT: The authors describe the method used at the "Sibelektrostal" plant for determining H_2 , O_2 , and N_2 by melting in a vacuum. The metal is melted in a graphite crucible at 1600-1700°C in a vacuum (10^{-4} mm Hg). The evolving gases enter an oxidizing furnace with a 350° temperature. In the analytical section of the apparatus the presence of H_2 , O_2 and N_2 is determined by measuring the volumes of the gases evolved with MacLeod manometers, after they have been fractionally frozen out with liquid O_2 at -183°. Time required for the determination of the three components is 35-40 min. The layout of the apparatus and of some specific parts and a detailed working procedure are adduced. The apparatus is used for routine analyses and for research work.

Card 1/1

N. G.

CSERNOHORSZKY, Vilmos, Dr.; LEIDER, Jozsef, Dr.; BELAV, Maria, Dr. JAKAB,
Tivadar, Dr.

On a synthetic muscle relaxant and on results of its application.
Orv. hetil. 100 no.35:1272-1274 30 Aug 59

1. A Budapesti Orvostudományi Egyetem I.sz. Sebészeti Klinikájának
(igazgató: Hedri Endre dr. egyet. tanár) közleménye.
(MUSCLE RELAXANTS, pharmacol)

BELAVENTSEY, M.A.; SOKOL'SKIY, G.A.; KNUNYANTS, I.L.

Fluorine-containing β -sultones. Report 12: Sulfofluoride-
difluoroacetyl fluoride. Izv. AN SSSR. Ser. khim. no.9:
1613-1616 '65. (MIRA 18:9)

SOKOL'SKIY, G.A.; BELAVENTSEV, M.A.; KNURYANTS, I.L.

Fluorine-containing β -sultones. Reports No.14: Trifluorovinyl
chlorosulfate. Izv. AN SSSR.Ser.khim. no.10:1804-1808 '65.
(MIRA 18:10)

PETROV, K.A.; NIFANT'YEV, E.Ye.; GOL'TSOVA, R.G.; BELAVENTSEV, M.A.;
KORNEYEV, S.M.

Esterification of phosphorous and phenylphosphinic acids. Zhur,-
ob.khim. 32 no.4:1277-1279 Ap '62. (MIRA 15'4)
(Phosphorous acid) (Phosphinic acid) (Esterification) .

ACCESSION NR: AT4017412

S/0000/63/000/000/0090/0093

AUTHOR: Petrov, K. A.; Nifant'yev, E. Ye.; Sopikova, I. I.; Belavintsev, M. A.

TITLE: Phosphorylated polysaccharides. IV. A method for phosphorylating cellulose using phosphorous acid

SOURCE: Tsellyuloza i yeye proizvodny*ye, sbornik statey (Cellulose and its derivatives). Moscow, 1963, 90-93

TOPIC TAGS: polysaccharide, polysaccharide phosphorylation, cellulose, cellulose phosphate, phosphocellulose, phosphorylation

ABSTRACT: Cellulose was phosphorylated by phosphorous acid using 3 different procedures: (1) reacting cellulose and molten phosphorous acid at 100C for 10 hours in a current of dry nitrogen, yielding a product containing 15-17% P; (2) in dimethylformamide or o-xylene solutions in a series of 20 to 60-hour tests at 130 and 160C yielding a product containing 4.8-12.2% P; (3) prolonged (2-3 days) heating at 80-140C in an atmosphere of an inert gas, which proved to be the most suitable since it yielded products containing up to 14% P. Different kinds of cellulose were tested, and the one swollen in water or pyridine was found best. The P-content in the product increased with the concentration of phosphorous acid up to a certain limit, the optimal ratio being one in which there is slightly more than

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ACCESSION NR: AT4017412

one phosphorous acid molecule for each *3*, d-glucose unit in the reacting mixture.
Orig. art. has: 2 graphs and 1 table.

ASSOCIATION: none

SUBMITTED: 12Jul62

DATE ACQ: 06Jan64

ENCL: 00

SUB CODE: CH

NO REF SOV: 006

OTHER: 003

Card 2/2

KHOLNYANIS, I.I., akademik; SOKOL'SKIY, G.A.; BELAVENTSEV, M.A.

Structure and reactivity of fluorine-containing β -sultones.
Dokl. AN SSSR 159 no.1:135-137 N '64. (MIRA 17:12)

KNUNYANTS, I.L. (Moskva); SOKOL'SKIY, G.A. (Moskva); BELAVENTSEV, M.A. (Moskva)

Ionotropic conversions of β -sultones. Teoret. i eksper. khim.
1 no.3:324-342 My-Je '65. (MIRA 18:9)

L 7893-66 EWT(m)/EPF(c)/EWP(j)/EWA(c) RPL WW/RM

ACC NR: AP5024965

SOURCE CODE: UR/0286/65/000/016/0027/0027

AUTHORS: Kmuryants, I. L.; Sokol'skiy, G. S.; Belaventsay, M. A.

ORG: none

TITLE: Method for obtaining octafluorocyclobutane. Class 12, No. 173733
 [announced by Military Academy of Chemical Defense, (Voyennaya akademiya
 khimicheskoy shashchity)]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 27

TOPIC TAGS: *fluorinated organic compound, tetrafluoroethylene, cyclic group, butane, organic synthetic process*

ABSTRACT: This Author Certificate presents a method for obtaining octafluorocyclobutane by heating the tetrafluoroethylene in an autoclave in the presence of polymerization inhibitors and by subsequent separation of the product by fractionation. To increase the yield of product, carbon dioxide or methylsulfite are used as polymerisation inhibitors, and the reaction is carried out at 150-170C.

SUB CODE: 07/
 NW

SUBM DATE: 15Dec64

Card 1/1

UDC: 547.513.07

L 9786-86 EWI(1)/EWA(1)/EWI(m)/EWP(1)/EWP(t)/EWA(h)-2/EWP(h)/EWA(e) IJP(c)/RPL

ACC NR: AP5028457 JD/WN/JW/RO/RM SOURCE CODE: UR/0286/65/000/020/0021/0021

AUTHORS: Knunyants, I. L.; Sokol'skiy, G. A.; Belaventsev, M. A.

ORG: none

TITLE: Method for obtaining sultones of β -oxypolyfluoroalkanesulfonic acids. Class 12, No. 175501, [announced by Military Academy of Chemical Defense (Voyennaya akademiya khimicheskoy zashchity)]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 21

TOPIC TAGS: sulfonate, sulfur compound, olefin, fluorine compound

ABSTRACT: This Author Certificate presents a method for obtaining sultones of β -oxypolyfluoroalkanesulfonic acids by heating a mixture of fluorolefin with sulfur trioxide at 50--60C. To simplify the process, the gaseous mixture of fluorolefin and sulfur trioxide is passed through a rectifying column. The product is separated by distillation in a current of fluorolefin and purified by crystallization.

SUB CODE: 11/ SUBM DATE: 15Dec64

PC

Cord 1/1

UDC: 547.431.6'221.07

L 05176-67 EWT(m)/EWP(j) RM
ACC NR: AP7000723 SOURCE CODE: UR/0062/66/000/006/1017/1022

KNUNYANTS, I. I., SOKOL'SKIY, G. A., and BELAVENTSEV, M. A.

21
B

"Fluorine-Containing Beta-Sultones. Communication 15. Alkyl Fluorosulfates"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, 1966, pp 1017-1022

Abstract: Tetrafluoroethane-beta-sultone reacts with methanesulfonyl chloride, alkyl chlorosulfates, and sulfonyl chloride to form trifluorovinyl chlorosulfate and the corresponding fluorosulfonyl compounds. The temperature conditions of the reaction and yield of trifluorovinyl chlorosulfate are determined by the nature of the substituent on the chlorosulfonyl group of the reactant. The most favorable conditions are observed when methanesulfonyl chloride, a compound characterized by high lability of the chlorine atom in the chlorosulfonyl group, is used. With increasing electron-acceptor properties of the substituent ($\text{CH}_3 < \text{RO} < \text{HO} < \text{Cl}$), the mobility of the chlorine in the reagent molecule decreases, and obstacles to the reaction increase. The reaction of fluorine-containing beta-sultones with alkyl chlorosulfates is a general method for producing previously unavailable aliphatic esters of fluorosulfonic acid. The reaction was conducted between tetrafluoroethane-beta-sultone and methyl, ethyl, n-propyl, n-butyl, n-amyl, and n-hexyl chlorosulfates, producing the

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UDC: 542.91 + 546.226

L 05176-67

ACC NR: AP7000723

corresponding alkyl fluorosulfates. The reactions of the latter with water, sodium chloride, and triethylamine were studied. In all cases the alkyl fluorosulfates proved to be very effective alkylating agents. The molecular refraction of the fluorosulfate group ROSO_2F was found to be 11.50. Orig. art. has: 7 formulas and 7 tables. [JPRS: 37,023]

ORG: none

TOPIC TAGS: organic sulfur compound, fluorinated organic compound

SUB CODE: 07 / SUBM DATE: 12 May 65 / ORIG REF: 004 / OTH REF: 001

Card 2/2

vmb

L 05174-67 EWP(m)/EWP(j) RM

ACC NR: AP7000725

SOURCE CODE: UR/0062/66/000/006/1027/1031

KNUNYANTS, I. I., BELAVENTSEV, M. A., ROPALO, P. P., SOKOL'SKIY, G. A. 28
B

"Fluorine-Containing Beta-Sultones. Communication 17. Derivates of Pentafluoropropenylsulfuric Acid"

Moscow, Izvestiia Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, 1966, pp 1027-1031

Abstract: Pentafluoropropenyl chlorosulfate was produced by the reaction of hexafluoropropane-2-beta-sultone with alkanesulfonyl chlorides (methane- and ethanesulfonyl chlorides), with alkyl chlorosulfates (n-amyl and n-hexyl chlorosulfates), and chlorosulfonic acid, as well as by the reaction of hexafluoropropylene with chlorosulfonic acid or with a solution of sulfuric anhydride. The latter reaction includes the intermediate formation and further conversion of hexafluoropropane-2-beta-sultone. The reaction of hexafluoropropane-2-beta-sultone with dialkyl sulfites yields pentafluoropropenylalkyl sulfates. Hydrolysis and alcoholysis of the latter were studied. The physical properties of the derivatives of pentafluoropropenylsulfuric acid obtained were also investigated.

Orig. art. has: 6 formulas and 6 tables. [JPRS: 37,023]

ORG: none

TOPIC TAGS: fluorinated organic compound, organic sulfur compound

SUB CODE: 07 / SUM DATE: 17Feb66 / ORIG REF: 004

Card 1/1 vmb

UDC: 542.91 + 546.226

0923

1890

L 05175-62 EWT(m)/EWP(j) RM

ACC NR: AP7000724

SOURCE CODE: UR/0062/66/000/006/1022/1027

KNUNYANTS, I. I., SOKOL'SKIY, G. A., and BELAVENTSEV, M. A. 22
B"Fluorine-Containing Beta-Sultones. Communication 16. Trifluorovinyl Esters of Alkylsulfuric Acids"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, 1966, pp 1022-1027

Abstract: Previously unknown trifluorovinyl esters of alkylsulfuric acids were produced in the reaction of tetrafluoroethane-beta-sultone with dialkyl sulfates and with dialkyl sulfites. The ability of aliphatic esters of sulfuric acid to react with a tetrafluoroethane-beta-sultone varies depending on the nature of the alkyl radical in the ester group of the sulfate, the reactivity increasing with length of the alkyl radical. In the case of aliphatic esters of sulfurous acid, the reaction with tetrafluoroethane-beta-sultone is very vigorous, requiring cooling to -10 to -30°. This method is recommended as a general preparative method for producing trifluorovinylalkyl sulfates. The molecular refraction of the trifluorovinyl group $R_{CF_2=CH}$ was found to be equal to 9.82. Orig. art. has: 4 formulas and 5 tables. [JPRS: 37,023]

ORG: none

TOPIC TAGS: vinyl compound, ester, organic sulfur compound, fluorinated organic compound

SUB CODE: 07 / SUBM DATE: 14May65 / ORIG REF: 005 / OTH REF: 001
Card 1/1 vmb UDC: 542.91 + 546.226

Belaventssev, N.V.

ARTAMONOV, D.V.; BELAVENTSEV, N.V.; KORSHUNOVA, V.A., redaktor;
KANDYKIN, A.P.; ~~TEKHNI~~ redaktor.

[Preparing the rims of railroad car wheels; according to
Engineer F.Kovalev's method] Obrabotka bandashei vagonnykh
kolesnykh par; obobshchenie po metodu inzh. Kovaleva.
Moskva, Gos.transp.shel-dor.isd-vo, 1952. 31 p. [Microfilm]
(Car wheels) (MLRA 9:4)